



United States Department of the Interior

FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

January 27, 2014

Mr. Clyde N. Thompson
Forest Supervisor
Monongahela National Forest
200 Sycamore Street
Elkins, West Virginia 26241

Re: Lockridge Prescribed Burn Project, Marlinton Ranger District, Monongahela National Forest, West Virginia

Dear Mr. Thompson:

This letter is in response to your request, dated September 5, 2013, and supplemented on November 1, 2013, for a site-specific review of the proposed Lockridge Prescribed Burn Project in the Marlinton Ranger District of the Monongahela National Forest (MNF) in Pocahontas County, West Virginia. The following comments are provided pursuant to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

In July 2006, the U.S. Fish and Wildlife Service (Service) issued a programmatic Biological Opinion (programmatic BO) for the 2006 Revision of the Monongahela National Forest Land and Resource Management Plan (Forest Plan) (Service 2006). The programmatic BO established a two-tiered consultation process for Forest Plan activities, whereby the MNF develops proposed activities and determines whether the proposed action may affect listed species or designated critical habitat. The Service subsequently reviews the proposed site-specific actions to ascertain if any effects will occur as a result of a site-specific project in a manner, or to an extent, not evaluated or previously disclosed and discussed in the Service's 2006 programmatic BO. We consider this site-specific project analysis for the proposed Lockridge Prescribed Burn Project to be a "Tier II" consultation process, with the programmatic BO constituting the "Tier I" consultation. Our project-specific (Tier II) consultations focus on: 1) reviewing and updating new information developed since the programmatic BO that may affect our analysis; 2) compliance with reasonable and prudent measures and associated terms and conditions in the programmatic BO; 3) consistency with the scope and effects previously analyzed and disclosed in the programmatic BO; 4) project-specific incidental take vs. take estimated in the programmatic BO; and 5) project-specific reasonable and prudent measures and associated terms and conditions (for non-jeopardy determinations).

DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes conducting prescribed burns on a total of 2,439 acres in 2 burn blocks on MNF land. Implementation is planned over the next 15 years with a 3 to 15 year burn interval per burn unit. The first burns are scheduled to occur over the next 8 years.

General activities in preparation for and execution of prescribed fire would include fire line construction, hazard tree mitigation, prescribed fire ignition, and mop-up.

Fire line construction would involve the removal of vegetation to bare mineral soil using hand tools and power tools (e.g., leaf blowers & chainsaws) as well as brush-hogs and dozers. An estimated 0.3 miles of fire lines would be cleared with approximately 0.2 miles cleared mechanically (e.g. tractor with disc, mowing, all-terrain vehicle (ATV) with rake or plow attachments, bulldozer) and approximately 0.1 miles cleared using hand tools. Existing roads would be used as fire lines where possible and would require little, if any, preparation. Fire lines established for previous burns will be reused. The majority of the mechanically created fire line would be on existing trails and roads that may need to be mowed, disced, plowed, or scraped with a bulldozer blade. Therefore, there would be no more than 0.2 miles (or 0.19 acres) of new mechanically-cleared fire line involving felling of trees. Fire lines would typically be 3 to 4 feet in width for hand lines and 8 feet (or width of the existing road) for brush-hogging and dozer lines. Fire lines would be rehabilitated upon completion of burning activities, as determined by Forest Service specialists following post-burn analyses.

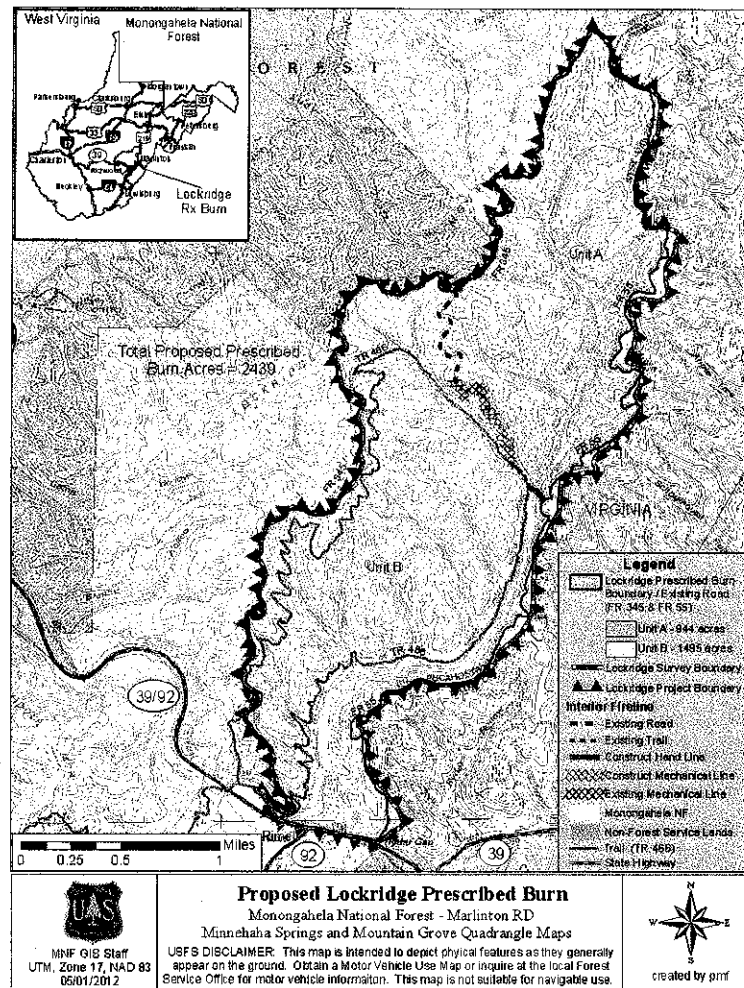
The spring fire season for the MNF is between February and May, and the fall fire season is between September and December. These are generally the driest and coldest months and, as such, present the most favorable weather conditions for prescribed fire. Prescribed fire ignition would mostly be accomplished with drip torches that contain a mix of gasoline and diesel fuel, although in the future, some areas could be burned using helicopter ignition (i.e., use of ping pong-like balls dropped from a helicopter that ignite the fire). Finally, mop-up would involve hand and power tools to ensure prescribed fires are out and a source of ignition is not left behind to start an unwanted fire after activities are complete. ATVs would be used for access to areas within treatment units prior to and during prescribed fires. Temporary ATV access points and trails would be rendered inconspicuous by raking leaf litter over exposed ground, and/or piling debris at entry points to discourage prolonged, illegal ATV use.

The project incorporates a number of conservation measures, in accordance with the terms and conditions of the programmatic BO, and as described more fully on pages 6-7 of the Biological Assessment. These measures include: constructing fire lines to avoid roost trees, the preparation of a project-specific burn plan that takes into account protection of threatened and endangered species, and measures to prevent erosion and sediment from entering stream channels.

Action Area

The action area consists of a total of 2,439 acres located approximately two miles east of Minnehaha Spring in Pocahontas County, West Virginia, as shown in Figure 1.

Figure 1: Lockridge Prescribed Burn Action Area



The project area falls within the Eastern Allegheny Mountain and Valley ecological land unit, which is a dissected plateau characterized by high, sharp, ridges, and low mountains, with narrow valleys. Most of the action area consists of closed canopy, forested stands between approximately 60 and 104 years old. In the action area, the major forest types are; red oak-red maple-chestnut oak, white oak, and white pine-white oak, with some sugar maple-beech found in moist areas. Also, mixed in many stands are basswood, white ash, birches, black cherry and hickories. Vegetation across the action area is greatly influenced by aspect of the slopes; northern and eastern faces are generally more moist and shady, and southern and western slopes and ridges are drier and more sunny. Both overstory and understory plants are affected by the differences. Historically, in the white oak-white pine forest types at the lower elevations, the primary disturbance agent was fire. At the higher elevations, which are generally more moist, disturbance was mostly caused by windthrow.

SPECIES NOT AFFECTED

We have reviewed the information contained in the November 2013, BA as well as existing survey data and supplemental information provided by staff at the MNF. Four federally listed plant species could potentially be present within the project area: shale barren rock cress (*Arabis serotina*), running buffalo clover (*Trifolium stoloniferum*), small-whorled pogonia (*Isotria medeoloides*), and Virginia spiraea (*Spiraea virginiana*). Botanical surveys were conducted within the project area in May 2012, and July 2011. No federally listed plant species were found during these surveys. There are no records of any Virginia big-eared bats (VBEB) (*Corynorhinus townsendii virginianus*) within the project area and the nearest VBEB cave is located over 30 miles away. There is no potentially suitable habitat for the Cheat Mountain salamander (*Plethodon nettingi*) within the project area. We therefore, concur with your determinations of no effect for the Virginia big-eared bat, Cheat Mountain salamander, shale barren rock cress, running buffalo clover, small-whorled pogonia, and Virginia spiraea.

SPECIES LIKELY TO BE ADVERSELY AFFECTED

As described in the Service's 2006 programmatic BO, adverse impacts are likely to occur to the Indiana bat (*Myotis sodalis*) from prescribed fire, harvesting, or tree removal under the MNF's management program activities. Therefore, given the nature of activities associated with the proposed Lockridge Prescribed Burn Project, we agree with your assessment that incidental take of Indiana bats is reasonably likely within the action area, and have provided this draft Tier II BO to address the potential adverse effects.

Proposed Species Present in the Action Area

On October 2, 2013, the Service proposed to list the northern long-eared bat (NLEB) (*M. septentrionalis*) as endangered (78 FR 61045). A final listing determination is anticipated to be made within one year of the proposed listing. The Service and the Forest Service have already begun discussions at the national, regional, and local levels to determine how to best address cooperative conservation of this species. We encourage the MNF to begin incorporating conservation measures into projects to protect the NLEB prior to any potential final listing decisions. In order to assist in your conservation planning, we have included information under the Baseline Conditions and Effects of the Action sections on the presence of the NLEB within the action area and on how this species may be affected by the project. If a decision is made to list this species, and the action is not completed before a final listing takes effect, additional formal consultation on this project will be required.

STATUS OF THE INDIANA BAT

The current status of the Indiana bat, its life history, and continued threats are thoroughly described in the programmatic BO (pages 27-43). This description remains current with the exception of proposed updates to the recovery plan and the identification of new threats, primarily related to White-nose Syndrome (WNS), and more current information on population numbers. This new information is summarized below.

A revised draft recovery plan was noticed in the Federal Register for public review and comment on April 16, 2007 (Service 2007). While this document has not yet been finalized, it represents the most current summary of information on the species and plan for its recovery. The draft recovery plan identifies four recovery units (RU): the Ozark-Central, Midwest, Appalachian Mountains, and Northeast. The MNF is located entirely in the Appalachian Mountains Recovery Unit (AMRU).

The 2007 draft recovery plan identified several additional threats including: 1) quarry and mining operations (summer and winter habitat), 2) forest conversion and firewood collection, 3) disease and parasites, 4) predation, 5) competition with other bat species, 6) environmental contaminants (not just "pesticides"), 7) climate change, and 8) collisions with man-made objects (e.g., wind turbines, communication towers, airplanes, and vehicles) (Service 2007). However, WNS is currently the most significant threat to the recovery of this species (Thogmartin *et al.* 2013).

WNS has been characterized as a condition primarily affecting hibernating bats. Affected bats usually exhibit a white fungus on their muzzles, wings, and ears (Blehert *et al.* 2009). The fungus associated with WNS was originally identified as a *Geomyces destructans* and was renamed *Pseudogymnoascus destructans* in 2013 (Gargas *et al.* 2009, Minnis and Lindner 2013). The fungus had not been named or identified prior to the emergence of WNS. The fungus thrives in the cold and humid conditions of bat hibernacula. The mode of transmission is primarily by bat-to-bat contact. In addition, people may unknowingly contribute to the spread of WNS by visiting affected caves and subsequently transporting fungal spores to unaffected caves. It is unclear how long symptoms take to manifest after exposure to the fungus. It is also unclear what the long-term effects to the Indiana bat will be (e.g., geographic spread, mortality within affected sites). Interestingly, *P. destructans* has been documented growing on hibernating bats in several European countries, but the fungus does not appear to be causing widespread mortality there (Puechmaille *et al.* 2010).

Bats affected with WNS do not always have a grossly visible fungus, but may display abnormal behaviors. Behaviors include bats roosting toward the entrances of hibernacula where the temperatures and humidity are far less stable than traditional roosting sites. Affected bats are also leaving their hibernacula and flying around during the day in cold temperatures far too early in the winter/spring before any insects are available for foraging. Many WNS-affected bats still inside hibernacula have not responded to human presence during surveys like healthy, unaffected bats do. Affected bats appear to be using up their essential fat reserves well before spring emergence.

WNS was first documented in a photograph taken in a New York cave in February 2006. By May 2013, evidence of WNS had been documented in 19 states (New York, Massachusetts, Maryland, Delaware, Vermont, New Hampshire, Connecticut, Virginia, West Virginia, Pennsylvania, New Jersey, Oklahoma, Missouri, Ohio, Kentucky, Indiana, Illinois, North Carolina, and Tennessee) and four Canadian Provinces, including many known Indiana bat hibernacula. In some affected hibernacula in New York and New England, 90 to 100 percent of the bats have died.

Service biologists and partners estimate that at least 5.7 million to 6.7 million bats have now died from WNS (Service 2012). Currently, most WNS-associated mortality has occurred at sites within the proposed Northeast and Appalachian Mountain RUs, but evidence of the fungus has been found at sites within the Midwest and Ozark Central RUs, as well. Future monitoring should reveal the extent to which WNS will affect bats within these latter two RUs.

Current Rangewide Population and Trends

The 2013 rangewide Indiana bat population was estimated to be 424,708 bats, with the vast majority occurring in the Midwestern and Ozark-Central RUs (Table 1). About 72 percent of the entire rangewide population occurs in the Midwestern RU. The AMRU (all of West Virginia, most of Pennsylvania, and portions of western Maryland, eastern Virginia, western North Carolina, and eastern Tennessee) supported approximately 3.3 percent of the 2013 total population estimate.

In the last 10 years, the rangewide population of Indiana bats had been generally stable with increases in eastern RUs and some declines in western RUs (Thogmartin *et al.* 2012). That trend has been reversed recently due to the spread of WNS. WNS was first detected in the Northeastern RU in 2006, and by 2013, the RU had declined by approximately 66 percent from a high in 2007 (Table 1). Although rangewide Indiana bat population estimates show a 13 percent increase from 2011 to 2013 (in the 8th year post-WNS), it is unclear if this increase represents true population growth, immigration from other areas, or other factors. Continued monitoring of population status will yield more conclusive trends as WNS moves through this population over time. As WNS continues to spread across the other RUs, these Indiana bat populations are expected to decline, though the nature and magnitude of population impacts from this disease may vary by RU. For the purposes of this BO, we assume the magnitude of the AMRU population declines will be similar to those occurring in the Northeast RU.

Table 1: Indiana bat population estimates rangewide and by recovery unit (RU). Estimates are based primarily on winter surveys at known priority 1 and 2 hibernacula. Additional data from priority 3 and 4 hibernacula were included when available; however, survey efforts for these smaller hibernacula vary over time (Service 2013a).

Recovery Unit (RU)	2005	2007	2009	2011	2013	2011-2013 percent change	% of 2013 total population rangewide
Appalachian Mountain:							
West Virginia	13,417	14,745	17,965	20,296	3,845	-81.1	0.7
Tennessee (East)	8,853	5,977	11,058	11,096	13,200	19.0	2.5
Pennsylvania	835	1,038	1,031	519	120	-76.9	<0.1
Virginia	567	535	514	556	418	-24.8	0.1
North Carolina	0	0	1	1	1	0.0	<0.1
Maryland	No info.	No info.	No info.	No info.	No	No info.	0

					info.		
RU Total	23,672	22,295	30,569	32,468	17,584	-45.8	3.3
Other RUs:							
Ozark-Central*	196,197	194,475	191,446	195,554	197,707	1.1	37.0
Midwest	265,729	320,342	281,977	308,324	300,675	-2.5	56.3
Northeast	42,710	53,763	33,855	16,124	18,273	13.3	3.4
Rangewide Total	548,308	590,875	537,847	552,470	534,239	-3.3	100.0

*A previously unknown Indiana bat hibernaculum was discovered in Missouri in 2012 containing approximately 123,000 Indiana bats when surveyed in January 2013. The Service has included the same number of Indiana bats as was found in 2013 to each previous biennium through 1981 to avoid an artificial spike in population trends based upon first-hand accounts of very large numbers of bats observed at this site for several decades.

Status of the Indiana Bat in the Appalachian Mountain Recovery Unit

Indiana bat populations in the AMRU exhibited a strongly increasing trend between 1983 and 2011 (Thogmartin *et al.* 2012), peaking at 32,468 individuals in 2011 (Table 1). However, beginning in 2008, WNS was first detected in the AMRU at several sites in Pennsylvania, and by 2010 had spread to the largest hibernacula in West Virginia. Population estimates from 2013 show a 46 percent decline in the AMRU compared to 2011, attributable to the impacts of WNS. The AMRU currently supports about 3 percent of the total range wide Indiana bat population with a total of 17,584 bats.

Status of the Indiana Bat in West Virginia in Winter

WNS was first documented in West Virginia in 2009, at Trout Cave, Pendleton County. Since that time, WNS has been confirmed in caves in Greenbrier, Hardy, Mercer, Monroe, Pendleton, Tucker, Fayette, Randolph, Grant, and Pocahontas counties (WVDNR 2011). In addition, a WNS-positive bat was found in Jefferson County, although no caves in that county have been confirmed positive.

Prior to WNS, the population trend in West Virginia was increasing (Table 1). The largest number of Indiana bats ever recorded in a West Virginia hibernaculum was 18,557 individuals in Hellhole in 2010. This was after WNS first appeared in the State, but before it had widely spread (WVDNR 2010). By 2013, the population in Hellhole had declined 86 percent to 2,540 Indiana bats and this decline is attributed to the spread of WNS (WVDNR 2013). WNS has spread to almost every Indiana bat cave checked in West Virginia and the total population statewide has dropped from a historic high of 20,296 Indiana bats in 2011 to 3,845 in 2013 (Table 1). For the purposes of this BO, we assume that all hibernacula in West Virginia and all bats within the action area will be affected by WNS.

Status of the Indiana Bat in West Virginia in Summer

Prior to 2003, there were no documented areas of Indiana bat maternity activity in the State, although a juvenile male was captured during the maternity period in Nicholas County in 1999.

This bat was not tracked so no additional information on the potential maternity usage in the area is available. In the summer of 2003, two post-lactating female Indiana bats were captured and tracked to roost trees in Boone County, West Virginia. These captures represented the first confirmed Indiana bat maternity activity in West Virginia. Surveys at this site during 2005 located two primary roost trees and resulted in a maximum emergence count of 73 bats. Maternity activity at this site has consistently been confirmed since then through annual surveys. In the summer of 2004, a second maternity colony of approximately 25 bats was confirmed through the capture and tracking of a lactating female Indiana bat. This colony was located adjacent to the MNF in Tucker County and is located within 2 miles of a known Indiana bat hibernaculum. The roost tree that the bats were eventually tracked to fell down the following summer. Subsequent surveys in the area have not been successful in capturing any reproductively-active females, although a number of male Indiana bats have been caught. The status of this maternity colony is unknown. A third maternity colony was documented as a result of surveys conducted in 2005 near Kanawha State Forest in Boone County. Emergence counts at the two identified primary roost trees documented a maximum count of 49 bats.

Surveys were conducted during the summer of 2006 at the site of the suspected maternity colony in Pendleton County. Emergence counts at the previously identified roost tree documented over 30 bats emerging from the tree. However, subsequent mist netting in the area suggests that no maternity activity was occurring at the site. Rather, these surveys indicate that the tree and nearby areas were used by a bachelor colony of male Indiana bats (B. Douglas, C. Stihler, D. Arling, C. Sanders; personal observations, 2005). Additional mist net surveys conducted in the general area in 2008 did result in the capture of a post-lactating female Indiana bat. A transmitter was placed on this bat. She was tracked for several hours, but despite extensive efforts, the bat could not be tracked to any roost trees. Nevertheless, the capture does provide evidence of a potential maternity roost in the area.

In the spring of 2010, female bats tracked emerging from a hibernaculum in Pennsylvania were found to have established a roosting area just over the State border in Ohio County, West Virginia. A maximum of 58 bats were found to emerge from a roost tree in this area. In the summer of 2010, a pregnant female was captured in Wetzel County. Radio telemetry was not conducted on this bat, and follow-up surveys were not able to locate any additional Indiana bats, so no additional information on this maternity area is available. In July and August 2012, five female Indiana bats were captured in Brooke and Ohio Counties along the course of a proposed pipeline. Subsequent tracking and emergence counts documented a number of separate roost areas, and up to 26 bats flying out of an individual roost tree. These captures may represent three different maternity colonies within the northern panhandle of West Virginia.

In addition to these captures near potential or confirmed maternity colonies, individual male Indiana bats have been captured in numerous locations throughout the State in the following counties: Clay, Fayette, Nicholas, Pendleton, Preston, Pocahontas, Randolph, Raleigh, and Tucker. Three male Indiana bats were captured on another site on the MNF in Pendleton County in 2004. These bats were tracked to a roost tree and subsequent emergence counts on that tree revealed 23 bats. Surveys conducted since that time have confirmed that this area supports a bachelor male colony roost. In July 2012, a number of male Indiana bats were captured along the Kanawha/Fayette County line in the same area that a juvenile male was captured in 2010. These adult male bats were subsequently tracked to a number of roost trees, as well as to the

underside of an interstate highway bridge that was later documented to have up to 89 Indiana bats roosting underneath. All of the bats that were captured, tracked, or examined were found to be males, providing evidence of an extensive bachelor colony in the area.

These captures of both male and female bats confirm that the Indiana bat uses forested habitats throughout the State for summer foraging and roosting. The increase in captures after 2002 may not reflect an actual increase in densities of Indiana bats summering within the State, rather, these results may reflect the fact that survey efforts in relation to project review and monitoring have increased in recent years.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and ongoing natural factors and the past and present impacts of all Federal, State, or private actions and other activities in the action area (50 CFR 402.02), including Federal actions in the area that have already undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultations in progress. The baseline conditions in relation to the Indiana bat and its habitat within the MNF are fully described in the programmatic BO (pages 39-40 and 43-47). These descriptions remain current with the following project-specific updates.

Status of the Species within the Action Area

A total of 9 sites in close proximity to the action area have been surveyed for bats since 2009. Per the Tier I BA/programmatic BO, mist net sites were selected based on quality of bat habitat in a given area rather than being limited to the specific area proposed to be affected by individual projects. As described in the programmatic BO, this survey approach has been found to be more effective at locating Indiana bats on the landscape than surveys designed specifically for project clearance. These surveys documented the presence of more than 207 bats of 7 different species in the vicinity of the action area. However, they did not capture or otherwise identify any Indiana bats or any evidence of Indiana bat maternity activity within the action area. The NLEB was the most common species documented during these surveys and comprised 62 percent of all the bats captured.

There are no known Indiana bat hibernacula in the Lockridge Prescribed Burn action area. The closest known Indiana bat hibernaculum is Tubb Cave located approximately 12 miles to the east of the action area. The most recent hibernacula survey for this cave was conducted in 2001. At that time, 20 Indiana bats and one NLEB were documented in the cave (WVDNR 2001). Fall swarming activity is believed to be concentrated within five miles of known hibernacula. Because all project activities are located farther than five miles away from Indiana bat hibernacula, no prime swarming habitat will be affected.

Given the absence of known hibernacula or maternity colonies in the action area, the lack of any Indiana bat captures near the action area, and that lack of prime swarming habitat in the action area, we conclude that the action area currently has a low likelihood of supporting large Indiana bat maternity or bachelor colonies. However, our Tier I consultation assumes that individual

Indiana bats may be present and are widely scattered on the MNF during the summer. This Tier II consultation assumes that individual Indiana bats may be present throughout the entire action area, including in areas where previous surveys had not documented Indiana bats.

Factors Affecting the Environment of the Species (on the MNF and in the Action Area)

Effects from past management activities (including timber harvesting and historical fire regimes) have produced the current baseline habitat condition. Most of the action area, as well as most of the overall MNF, consists of closed canopy forested stands between approximately 60 and 104 years old. Historically, frequent surface fires ignited by Native Americans, European settlers, and lightning maintained open forests of oak, chestnut, and pine over much of the Appalachian Mountains. Reduced fire activity during the twentieth century has reduced the acreage in these types of open forest conditions and also hindered regeneration of various oak species. Reduced fire activity during the twentieth century has contributed to increases in tree and shrub density and to shifts in tree species composition. These changes have reduced habitat quality for plant and animal species that require open woodland habitat. Successful oak (*Quercus sp.*) regeneration is a widely recognized forest management problem of serious magnitude throughout the hardwood regions of the eastern and central United States. Both managed and unmanaged forest stands exhibit declining oak abundance as overstory oaks experience natural mortality or are harvested. Consequently, other tree species have become increasingly dominant in extant stands. For example, maple (*Acer sp.*) has exhibited dramatic gains in Eastern forests over the past three decades in terms of both stem numbers and growing stock volume.

EFFECTS OF THE ACTION

The proposed action would disturb a total of approximately 2,439 acres of habitat through conducting prescribed burns and 0.3 miles of habitat through construction of fire lines. No activities will occur within a five-mile radius of a known Indiana bat hibernaculum or within two miles of a known maternity colony. Consequently, no impacts to hibernacula, primary range, or known maternity sites will occur.

Although no Indiana bats have been captured in the vicinity of the project during previous survey efforts, the project area does provide potential suitable roosting and foraging habitat for the Indiana bat, and some activities would occur outside of the Indiana bat hibernation period. Without completing additional bat surveys throughout the duration of the project, or complete avoidance of project activities during the hibernation period, it is not possible to rule out the possibility that Indiana bats could be present in the action area and could potentially be taken by the proposed action. Potential adverse effects include direct mortality, injury, harm, or harassment of bats present within the action area when activities are being conducted, and indirect effects as a result of changes in habitat suitability for the Indiana bat.

Direct Effects of Project Activities

Some tree felling activities associated with the proposed project would occur outside of the hibernation period. Tree removal during the non-hibernation period (April 1 – November 14) may result in mortality or injury (take) of an individual roosting Indiana bat, if a tree that contains a roosting bat is intentionally removed or felled accidentally. If a bat is not killed

during the removal of an occupied roost tree, it may be forced to find an alternative roost tree, potentially expending a significant amount of energy and resulting in harm or harassment of the individual. The potential adverse effects are fully described on pages 51-53 of the programmatic BO and include increased stress, increased energy demands from searching for new roost areas, and decreased thermoregulatory efficiency, all of which could lead to reduced reproductive success.

Based on the results of surveys conducted in the vicinity of the project, the small scale of the proposed tree removal activities, and the incorporation of the terms and conditions of the programmatic BO (e.g. retention of snags and shag bark hickories that are most likely to be high quality roost trees, etc.), the Service concludes that while there is potential to unknowingly remove an established Indiana bat roost tree during construction of 0.3 miles (0.19 acres) of fire lines for the Lockridge Burn project, this likelihood is small, and would be restricted to the removal of single (rather than multiple) lower quality alternate roost trees. This determination is consistent with the rationale and conclusions of the programmatic BO, and is more fully described on page 53 of that document.

The proposed project will also conduct prescribed burns on 2,439 acres. Burns may be conducted during the spring fire season (February to May), or the fall fire season (September to December). Conducting prescribed burning outside the hibernation period could result in direct mortality or injury to the Indiana bat by burning, heat exposure, or smoke inhalation. Bats also may be exposed to elevated concentrations of potentially harmful compounds within the smoke (e.g., carbon monoxide and irritants) (Dickinson *et al.* 2009). However, due to the anticipated timing of the burns, involant young will not be present during the burns and all bats should be mobile during the burning activities. At the time the programmatic BO was written, anecdotal evidence suggested that volant bats would likely be able to flee from the proposed type of prescribed fire, and the chance of direct mortality of bats was low as long as fires were not conducted when involant young could be present. Since that time, additional research has been conducted that documents adult bats flying from roosts as prescribed fire approached, and then returning to roost in the same general area post-burn (Dickinson *et al.* 2009, Lacki *et al.* 2009). In addition, other studies have predicted that risk of direct mortality and injury to bats from prescribed fire is low as long as fire intensity and crown scorch height are low (Dickinson 2010). The results of these studies provide further support for the conclusion that the potential for direct mortality of bats from prescribed burns associated with the proposed action is low. There may be some adverse effects in the form of harm and harassment of Indiana bats being forced to flee from roosting and foraging areas. However, these adverse effects are expected to be short-term and localized. The potential direct effects from prescribed fire from this project are consistent with the findings of the programmatic BO and are more fully described on pages 57-59 of that document.

Indirect Effects of Project Activities on Habitat Suitability

Although the information in the programmatic BO is still accurate, additional research has been conducted since that time that further documents how prescribed fire may affect habitat suitability for *Myotis* bats (Boyles and Aubrey 2006, Dickinson 2010, Dickinson *et al.* 2009, Johnson *et al.* 2009, Johnson *et al.* 2010, Lacki *et al.* 2009, Timpone *et al.* 2009). This research suggests that indirect effects may include short-term loss of roost trees and decreases in prey

abundance, followed by long-term increases in roost abundance and suitability, and increased prey abundance. These types of both adverse and beneficial effects have been noted for both the Indiana bat and the NLEB. While there are some differences in roosting and foraging habitat preferences between these species, as noted below, there is much overlap in habitat usage between these species, and in most cases general conclusions based on research on one species will also be applicable to the other.

Effects on Roosting Habitat

The Indiana bat and NLEB both use similar types of trees as roosts. However, Indiana bats may have more specific roost requirements in that Indiana bats use trees with higher solar exposure, and more frequently use snags with sloughing bark versus cavity trees, whereas NLEB were less restricted in roost selection (Timpone *et al.* 2009). For Indiana bats, the epitome of a high-quality primary maternity roost appears to be a large dead tree, exposed to solar radiation, with large plates of sloughing bark (Dickenson *et al.* 2009).

Prescribed fire can create a greater abundance of these types of potential roost trees because fires can cause bark of live trees to peel away from the sapwood creating the sloughing bark that is preferred by Indiana bats (Johnson *et al.* 2010). The availability of suitable roosts (including roosts with cavities and exfoliating bark) is greater in burned areas compared to unburned areas (Boyles and Aubrey 2006, Dickenson *et al.* 2009, Johnson *et al.* 2010). Indiana bats have been found roosting under exfoliating bark in fire-killed maple trees, and have selected these new roost trees over roost trees used in previous years (Johnson *et al.* 2010). Similarly, NLEB have been found to use more roosts in burned areas than unburned areas (74 percent versus 26 percent) (Lacki *et al.* 2009).

Tree species that consistently form high quality Indiana bat roosts include shellbark hickory (*Carya laciniosa*), shagbark hickory (*C. ovata*), and white oak (*Quercus alba*). Regeneration of white oak and hickory increases as a result of low-intensity fires and/or repeated fires below open canopies (Johnson *et al.* 2010, Dickinson *et al.* 2009). Therefore, over the long-term, prescribed fire is anticipated to increase the abundance of tree species that form high quality roosts for the Indiana bat. Similarly, fire creates canopy gaps that allow for regeneration of shade-intolerant species such as black locust, a preferred roost tree species for the NLEB (Dickenson *et al.* 2009, Johnson *et al.* 2009).

Fires can also create a more open canopy structure that can improve roost quality by increasing the amount of solar radiation reaching the roost. Canopy light penetration was higher and canopy tree density was lower in burned forest than in unburned forest (Boyles and Aubrey 2006). Additionally, canopy gaps in the burned area are associated with slightly higher maximum daily temperatures at roost trees (Johnson *et al.* 2009). Higher roost temperatures could facilitate more rapid growth of developing juvenile bats (Johnson *et al.* 2009). As a result, the abundance of trees with characteristics suitable for roosting and the percentage of the forested area with suitable roosts bats should be increased after fires (Boyles and Aubrey 2006). Studies in West Virginia found that the NLEB responded favorably to prescribed fire by using new roost trees that were located in canopy gaps created as a result of the fire (Johnson *et al.* 2009).

Conversely, fire may also destroy or accelerate the decline of existing roost trees, particularly of older snags, by burning the bases of the trees and weakening their structure, causing them to fall over quicker (Johnson *et al.* 2009, Dickinson *et al.* 2009). One study found that up to 20 percent of existing standing snags were lost post-fire, and that few new snags were created (Lacki *et al.* 2009).

In summary, prescribed fire may result in both adverse and beneficial effects on roosting habitat through immediate loss of existing roosts and potential immediate creation of some new roosts, followed by short-term increases in the suitability of remaining and created roosts, and long-term changes in forest composition towards a greater abundance of trees likely to create suitable roosts in the future. Unfortunately, existing data are insufficient to fully quantify or compare the relative impact of these adverse and beneficial effects. For instance, the long-term tradeoff between roost creation and roost loss in mixed oak forests under burning regimes is unknown (Dickinson *et al.* 2009). One research project concluded that prescribed fire, at minimum, provoked no response from the Indiana bat in terms of roost tree selection, and in some cases may create additional roost resources (Johnson *et al.* 2010). As a result, we conclude the overall effect of the proposed action on roost suitability may be neutral to potentially beneficial.

Effects on Foraging Habitat

Prescribed fire may affect foraging habitat by changing the structure of the forest and by changing the abundance of prey within the area (Dickinson *et al.* 2009). As noted above, fires create a forest with a more open canopy structure. Data on foraging activity show the Indiana bat has a preference for foraging in relatively closed-canopy stands, and studies in Tucker County, West Virginia, found that when Indiana bats were detected foraging in uplands impacted by a variety of forestry practices, they were detected most frequently in areas with the highest canopy cover (Dickinson *et al.* 2009). Similarly, NLEBs have shown a preference for foraging in heavily forested mid-slope areas, regardless of burn condition, suggesting these bats feed in and around closed canopies and are likely clutter-adapted (Lacki *et al.* 2009). These studies suggest that the reduction in canopy closure as a result of prescribed burning could have a negative effect on foraging suitability for both the Indiana bat and NLEB. However, that same data does not indicate that bats avoid foraging in or around areas that have been burned. For example, the size of female NLEB home ranges and core areas did not vary between bats radio tracked before and after fires, and the home ranges of these bats were located closer to burned habitats following fires than to unburned habitats (Lacki *et al.* 2009). The researchers for this study suggest that NLEBs responded to habitat alterations resulting from prescribed fires by shifting the location of their foraging areas to take advantage of changes in insect prey availability (Lacki *et al.* 2009). While explicit studies on the effects of forest burning on Indiana bat foraging habitat are limited, the data suggest that prescribed fire may have a similar effect on Indiana bat foraging patterns (Dickinson *et al.* 2009).

Immediately after fires, insect abundance typically declines (Lacki *et al.* 2009). Therefore, fires conducted in the late winter and early spring may reduce abundance of bat prey during critical periods when bats are coming out of hibernation, are migrating, or are pregnant (Johnson *et al.* 2009). However, over a longer-term (within one year), abundance of coleopterans (beetles), dipterans (flies), and all insects combined has been shown to increase following prescribed fires (Lacki *et al.* 2009). These increases can last for up to 16 years post-burn. Because lepidopterans (moths and butterflies), coleopterans, and dipterans are the three most important groups of insect

prey for Indiana bats, researchers have concluded that fire does indeed improve foraging conditions for *Myotis* species in the long-term by increasing prey quantity in the form of insects attracted to post-fire dead wood (Lacki *et al.* 2009, Dickinson 2010). As a result, we conclude the proposed action may have a short-term adverse and long-term beneficial effect on prey abundance, and thus foraging habitat suitability in the action area.

Summary of Effects of the Action

Potential effects of the action include direct mortality, injury, harm, or harassment of bats present within the action area when activities are being conducted, and indirect effects as a result of changes in habitat suitability. Direct mortality, injury, harm, or harassment could occur during removal of roost trees from construction of the fire lines or during the prescribed burns. While there is potential to unknowingly remove an established Indiana bat roost tree during construction fire lines, this likelihood is small, and would be restricted to the removal of single (rather than multiple) lower quality alternate roost trees. The potential for direct mortality of bats from prescribed burns associated with the proposed action is also low. There may be some adverse effects in the form of harm and harassment of Indiana bats being forced to flee from roosting and foraging areas. However, these adverse effects are expected to be short-term and localized.

The proposed project could also alter roosting or foraging habitat suitability. Prescribed fire may result in both adverse and beneficial effects on roosting habitat through immediate loss of existing roosts and potential immediate creation of some new roosts, followed by short-term increases in the suitability of remaining and created roosts, and long-term changes in forest composition towards a greater abundance of trees likely to create suitable roosts in the future. The overall effect of the proposed action on roost suitability may be neutral to beneficial. There may be some short-term negative effects on foraging suitability due to the opening of the forest canopy and a reduction in prey availability. However, these effects are not likely to be significant enough to make bats avoid affected areas for foraging. Over the long-term, the project will have a beneficial effect on prey abundance, and thus foraging habitat suitability in the action area.

The potential effects of the proposed action are consistent with those described in the programmatic BO, as supplemented by the information provided above. The implementation of the terms and conditions of the programmatic BO, and project-specific and forest-wide avoidance and conservation measures as described in the BA, will minimize any incidental take and ensure that this area will continue to provide potential habitat to support Indiana bats. All proposed activities fall within the scale and the scope addressed in the programmatic BO and within the level of take identified in the Incidental Take Statement.

White-nose Syndrome

This BO assumes that WNS will affect any Indiana bats present within the action area over the proposed life of the project. Bats affected but not killed by WNS during hibernation may be weakened by the effects of the disease and may have extremely reduced fat reserves and damaged wing membranes. These effects may reduce their capability to fly or to survive long-distance migrations to summer roosting or maternity areas. Affected bats may also be more

likely to stay closer to the hibernation site for a longer time period following spring emergence. Since the action area is approximately 12 miles away from an Indiana bat hibernacula, there is a potential that bats affected by WNS may be more likely use the action area for at least temporary foraging and roosting rather than migrating longer distances to established summer home ranges.

While none of the MNF's proposed actions will alter the amount or extent of mortality or harm to Indiana bats resulting directly from WNS, the proposed action does have the potential to increase or decrease the chances that WNS-affected bats present in the action area will survive and recover. For example, WNS-affected bats roosting in the area immediately after emerging from hibernation may have damaged wings and therefore could be less able to quickly fly away from fire and smoke during the prescribed burn. As a result, there may be an increased chance of WNS-affected bats being killed or harmed as a result of the project, particularly if burns are conducted early in the spring. Alternatively, the proposed project may alter Indiana bat habitat in a manner that could increase the vigor and recovery of any WNS-affected Indiana bats using the area. As described above, the proposed project is likely to improve roosting and foraging habitat over the long-term through snag creation and improvement in abundance and diversity of insects. Therefore, after project implementation, there may be more foraging and roosting opportunities located in relatively close proximity to a hibernaculum. WNS-affected bats could thus save energy by reducing the distances they travel after emerging from hibernation or when moving between roosting and foraging areas. They could also have increased foraging success. This could allow bats to more quickly regain fat-reserves, and therefore increase the chances of recovery from the effects of WNS.

Research into how WNS affects bat physiology and behavior is ongoing, and current information is not sufficient to quantify or predict the full range and scope of potential effects, or compare the relative likelihood and significance of the potential adverse and beneficial effects described above. The MNF's continued monitoring of both Indiana bat hibernacula and summer usage patterns within MNF and the action area and will provide further information on the scope and type of effects that WNS has on bats both within the action area and throughout the range of the species. If future monitoring conducted on the MNF identifies additional evidence of Indiana bats utilizing the project areas, or if additional adverse effects beyond what is described here are anticipated, the MNF will consult with the Service and the West Virginia Division of Natural Resource to determine whether further protective measures should be implemented in accordance with the MNF Forest Plan and the programmatic BO.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions reasonably certain to occur within the action area. Future Federal actions, unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. All lands within the action area are owned by the MNF. All actions taking place on Federal lands will require a section 7 consultation and therefore are not considered cumulative effects of the action. Therefore, no cumulative effects are expected to occur.

CONCLUSION

The actions and effects associated with the proposed activities for the Lockridge Prescribed Burn Project are consistent with those identified and discussed in the Service's 2006 programmatic BO. After reviewing the size and scope of the project, the environmental baseline, the overall status of the Indiana bat, new information on the species, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Indiana bat and that a significant cumulative reduction in population numbers of the Indiana bat will not occur from the proposed action because: 1) the project should not substantially reduce the availability or suitability of swarming, roosting or foraging habitat for the Indiana bat; 2) no known maternity or bachelor colonies are located in close proximity to the project; and 3) avoidance and minimization measures incorporated into the project have reduced the potential for damaging roost trees and associated direct and indirect take of bats.

INCIDENTAL TAKE STATEMENT

The Service anticipates that the proposed actions associated with the Lockridge Prescribed Burn Project will result in the incidental take of Indiana bat as outlined in Table 2. The type and amount of anticipated incidental take is consistent with that described in the programmatic BO and does not cause the total annual level of incidental take (via harm to forested acres) in the programmatic BO to be exceeded. No other projects involving incidental take have been authorized in fiscal year 2014, so there is no cumulative take for this year.

Table 2: Authorized incidental take (as measured indirectly by acreage) on the Monongahela National Forest during fiscal year 2014.

Activity	Lockridge Burn Project	Annual Incidental Take Authorized per Tier I BO
Prescribed Fire	2,439 acres	3,000 acres
Timber Harvest	0.19 acres (for fire lines)	6,000 acres
Road Construction and Maintenance	none	74 acres
Mineral Development	none	78 acres

As shown in Table 3, the actual incidental take reported by the Forest Service has consistently been significantly below the annual levels estimated (exempted) in the programmatic BO, therefore, we do not anticipate that implementation of this project will result in the take levels in the programmatic BO to be exceeded.

Table 3: Previously authorized annual incidental take (as measured indirectly by acreage) on the Monongahela National Forest.

Activity	Annual Authorization (acres)	2007	2008	2009	2010	2011	2012	2013	TOTAL	Maximum Cumulative Authorized Acres (annual amt. times # years)	% Authorized Acres	% MNF land base
Timber harvest	6,000	905	424	516	318	446	1,072	703	4,384	42,000	10%	0.48%
Prescribed fire	3,000	124	342	156	1,016	2,213	1,961	863	6,675	21,000	32%	0.72%
Mineral exploration & development	78	0	0	4.9	0	0	0	0	4.9	546	1%	0.00%
Road construction	74	13	2	0	15.5	7.8	9.5	10.6	58.4	518	11%	0.01%
TOTAL		1,042	768	677	1,349	2,667	3,042.5	1,576.6	11,122.1	64,064	17%	1.21%

Please note that as per the terms and conditions of the programmatic BO, Tier II BOs, including this one, will track the amount of incidental take authorized. However, incidental take does not actually occur until the time that the project is implemented. Most projects authorized under Tier II BOs will not be implemented for a number of years; therefore, the Forest Service annually reports the total amount of incidental take that occurs each year and for each project. This number is compared to the maximum annual incidental take as authorized in the programmatic BO and as shown above. If it is determined during future project planning or the course of project implementation that either the authorized amount of project-specific incidental take as detailed above, or the maximum amount of annual incidental take as detailed in the programmatic BO, may be exceeded, additional consultation with the Service will be required.

*Reasonable and Prudent Measures
with Terms and Conditions*

In order to be exempt from the prohibition of Section 9 of the ESA, the MNF and any contractors or agents acting under the MNF must comply with all the terms and conditions in the 2006 programmatic BO as well as any additional project-specific terms and conditions described below. These terms and conditions are non-discretionary.

The Service has determined that the implementing the reasonable and prudent measures specified in the programmatic BO, in conjunction with the project specific avoidance and conservation measures as described in the Lockridge Prescribed Burn Project Biological Assessment, will appropriately minimize the impact of incidental take anticipated for the proposed activities in this project area. Therefore, the following site-specific RPM will apply:

- The MNF will implement site-specific avoidance and conservation measures as proposed in the November 2013 Lockridge Prescribed Burn Project Biological Assessment.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Recent research papers on the potential effects of prescribed fire suggest that the following management recommendations be incorporated when developing prescribed burn plans within areas potentially occupied by *Myotis* bats (Dickinson 2010, Dickinson *et al.* 2009, Johnson *et al.* 2010)¹:

- Reduce fire line intensities and burn in breezy conditions in order to mitigate risk to bats from heat effects.
- Extend lower intensity burning later into the spring in order to reduce risk to bats because they arouse from torpor more quickly in warmer ambient temperatures.
- Proceed slowly during the early phase of ignition in order to provide cues to bats that fire is on the landscape and allow them to arouse from torpor and flush.
- Systematically rotate fire treatments among adjacent forest stands in order to maintain or increase density of roost trees and temporally stagger prescribed fire treatments among adjacent forest stands, in order to ensure potential roost trees are maintained in an area.
- Evaluate the size of burn units in relation to the size of potential bat home ranges and then locate burn unit boundaries so that entire home ranges would not be burned over in a single year, or conduct the burns in a way that creates a patchwork of burned and unburned areas within potential bat home ranges.

The Service recommends that the MNF incorporate these management recommendations when implementing prescribed burns associated with the proposed action, and when developing plans for any future prescribed burn plans within the MNF. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects, or benefiting listed species or their habitats, the MNF should notify the Service when any of these conservation recommendations are implemented.

REINITIATION NOTICE

Incidental take that occurs as a result of this project cannot exceed project-specific level of incidental take established above. Incidental take that occurs as a result of this and other projects on the MNF cannot exceed the annual or cumulative incidental take levels established in the programmatic BO. If implementation of any project or projects is anticipated to exceed these take levels, further consultation will be necessary. To ensure that incidental take is not exceeded, annual reports should be provided to this office tabulating the amount of incidental take on

¹ Conducting burns during the hibernation period, would entirely avoid the risks to bats described in the first three bullets.

projects being implemented and authorized throughout the MNF, as indirectly measured by acres affected. Incidental take that is implemented each year will be compared against the level authorized in the BO to determine whether annual levels have been exceeded. To determine whether take is exceeded at the project level, the level of take implemented will be compared against the level authorized under each Tier II BO.

This fulfills your consultation requirements for this action. Should new information reveal effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or a new species is listed or critical habitat is designated that may be affected by the action; or the amount or extent of incidental take is exceeded, reinitiation of formal consultation as outlined in 50 CFR 402.16 is required.

If you have any questions regarding this letter, please contact Ms. Barbara Douglas of my staff at (304) 636-6586, Ext. 19, or at the letterhead address.

Sincerely,

A handwritten signature in black ink, appearing to read "John Schmidt", written in a cursive style.

John Schmidt,
Field Supervisor

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Mr. Clyde N. Thompson
January 27, 2014

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cc:

Martin, J – Marlinton Ranger District

Project File

Reader File

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